Original Article

The Correlation between Pain, Fatigue, and Quality of Life among Cancer Patients who were Undergoing Chemotherapy

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ABSTRACT

OBJECTIVE: To analyze the correlation between pain, fatigue, and quality of life in chemotherapy patients.

METHODOLOGY: A cross-sectional study was conducted from June to August 2024 at the Oncology Center of Aceh Government Regional Public Hospital. A convenience sampling method was used to select 84 patients undergoing chemotherapy. All participants were invited to complete a general information questionnaire, the Brief Pain Inventory (BFI), the Multidimensional Fatigue Inventory (MFI), and the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ C30). All questionnaires were validated and found reliable in their Chinese versions. Data were analyzed using Pearson correlation tests.

RESULTS: Regarding the most severe pain experienced in the past 24 hours, 19 patients (22.6%) reported mild pain, 23 (27.4%) reported moderate pain, and 42 (50%) reported severe pain. There was a significant correlation between pain and fatigue ($p < 0.001$) as well as quality of life ($p < 0.001$). Additionally, fatigue was significantly correlated with quality of life ($p < 0.003$).

CONCLUSION: Patients experiencing moderate to severe pain have more fatigue symptoms and lower quality of life than those with mild pain. Nurses should prioritize these patients, investigate the mechanisms of symptom interactions, and implement combined symptom interventions to improve their quality of life.

KEYWORDS: Pain, Fatigue, Quality of Life, Cancer, Chemotherapy

INTRODUCTION

Cancer is characterized by the uncontrolled growth of specific body cells, which destroys other cells and body tissues, often resulting in death[1]. Cancer is the second leading cause of death globally, with 9.6 million deaths each year. Global Burden of Cancer Study from the World Health Organization (WHO) reported data of 19.3 million new cancer cases, with 10 million deaths in 2020[2]. The new cancer cases in Indonesia are 396,314, with a death toll of 234,511[3]. Based on the Basic Health Research data (2018), Aceh recorded 6,541 cancer patients. Pain and fatigue are common symptoms experienced by cancer patients but are often unrecognized and untreated[4].

Pain is a common complaint among cancer patients following treatment. Pain is the most frequently experienced reported symptom, regardless of metastasis[5]. Pain intensity generally increases during chemotherapy, often escalating from moderate to severe levels. When left untreated, pain can become chronic and is consistently associated with poorer quality of life due to fatigue and decreased functional ability[6].

Fatigue is a multidimensional symptom experienced physically, cognitively, and emotionally. It occurs at every stage of cancer and negatively impacts the quality of life. The tiredness in cancer patients increases in metastasis cases and among those undergoing chemotherapy[7]. The impact of fatigue includes the inability to function, the feeling of extreme tiredness, and the lack of energy associated with a cancer diagnosis or cancer treatment[8]⁸. Fatigue generally becomes a burdening experience and can persist for months or even years after cancer treatment[9].

The presence of cancer and its treatment can affect the quality of life of cancer patients. Cancer and its treatment significantly impact patients' lives, including their ability to fulfill roles in their family, work, and engage in social activities[10]. Research conducted by Khusniyati, Yona, and Kariasa (2019) found that patients with lower fatigue levels reported better quality of life, while higher fatigue levels were associated with poorer quality of life. Fatigue is a long-term side effect of treatment[11].

A preliminary study at the oncology center of Aceh Government Regional General Hospital (March-May 2024) documented 685 inpatients and 330 outpatients with cancers including Ca-Mammae, Ca-Ovarium, Ca-Larynx, Ca-Colon, Ca-Rectum, Ca-Lung, Ca-NHL, Ca-Bladder, Ca-Nasopharynx, Ca-Cervix, Ca-Mandible, Ca-Pancreas, Ca-Testis, Ca-Endometrium, and others. Interviews with 10 chemotherapy patients in their third cycle revealed that six experienced pains in bones, muscles, and joints, while four reported fatigue and lack of motivation.

Given these observations, the authors seek to

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investigate the correlation between pain, fatigue, and quality of life among cancer patients undergoing chemotherapy at the oncology center of Aceh Government Regional Public Hospital.

METHODOLOGY

Study Design

The research employed a descriptive correlational method with a cross-sectional approach. This research was conducted at the oncology center of Aceh Government Regional Public Hospital from June to August 2024.

Population and Sample

The study population was all cancer patients undergoing chemotherapy at the oncology center of Aceh Government Regional Public Hospital. The sample size was determined using power analysis with G*Power 3.1 software, applying an effect size of 0.62 based on previous research[12], resulting in a sample size of 84 respondents [1314]. A convenience sampling method was used to select cancer patients undergoing chemotherapy in Aceh province, Indonesia. The inclusion criteria were as follows: patients who had received at least one cycle of chemotherapy, were over 18 years old, voluntarily participated in the study and signed informed consent, possessed basic language comprehension abilities, and were fully conscious with normal cognitive function.

Instrument

General information questionnaire

The questionnaire gathered demographic and clinical data, including age, gender, educational level, occupation, marital status, duration of suffering from cancer, chemotherapy cycle, other disease, surgical history, and history of radiotherapy.

The Brief Pain Inventory (BPI)

BPI is a pain experience measurement tool that assesses the severity of pain and the impact on daily functioning caused by the pain experienced by the patient. It was measured using a ratio scale from 0 to 10. Pain intensity was scored from 0 (no pain) to 10 (the worst pain).

The Multidimensional Fatigue Inventory (MFI)

The Multidimensional Fatigue Inventory (MFI) was first developed by Smets in 1995 to assess fatigue in cancer patients. The Multidimensional Fatigue Inventory (MFI-20) consists of 20 items, a self-report instrument designed to measure five dimensions of fatigue: general fatigue (Q1, Q5, Q12, Q16), physical fatigue (Q2, Q8, Q14, Q20), reduced activity (Q4, Q9, Q15, Q18), reduced motivation (Q3, Q6, Q10, Q17), and mental fatigue. (Q7, Q11, Q13, Q19). Each question was scored from one to five, and each dimension consisted of five questions. Therefore, the dimension scores varied from 4 to 20 (a higher score indicates more fatigue). The MFI-20 validation met the validity and reliability requirements. The MFI-20 was validated in Sweden on cancer patients[15].

The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ C30)

This questionnaire evaluates 15 areas of Quality of Life (QOL) using 30 items. It includes five functional areas: physical function (5 items: Q1–Q5), role function (2 items: Q6, Q7), emotional function (4 items: Q21–Q24), cognitive function (2 items: Q20, Q25), and social function (2 items: Q26, Q27). Three symptom areas are assessed: fatigue (3 items: Q10, Q12, Q18), nausea and vomiting (2 items: Q14, Q15), and pain (2 items: Q9, Q19). Additionally, there are six single-symptom items: dyspnea (Q8), insomnia (Q11), appetite loss (Q13), constipation (Q16), diarrhea (Q17), and financial difficulties (Q28). Global health status is evaluated with two items (Q29, Q30) using a 7-point scale ranging from "very poor" to "very good." Other items are rated on a 4-point scale: 1 (no), 2 (a little), 3 (often), and 4 (very often).

This questionnaire has undergone validity and reliability testing for its Chinese version. Cronbach's α coefficients ranged from 0.722 to 0.870, and the test-retest reliability exceeded 0.7. These results confirmed that the Chinese version of the questionnaire demonstrates strong reliability and validity, making it suitable for this study[4].

Data collection

Following the research procedure, after obtaining permission from the head nurse, the researchers visited eligible patients at their bedsides to administer the questionnaires. With consent from the patients and their families, the researchers explained the questionnaire's completion process and highlighted key points to consider. The patients then completed the questionnaire independently.

Data Analysis

Two researchers input and verified all data. Continuous variables were explained by mean and standard deviation; categories were described by frequency and percentage. The normality test results confirmed that the data was normally distributed, so the Pearson correlation test was performed..

Ethical Statement

The protocol for this observational study was prepared according to the Declaration of Helsinki and the Ethical Guidelines for Epidemiology Research[16]. The ethics committee approved Aceh Government Regional General Hospital (164/ETIK-RSUDZA/2024). According to seven WHO 2011 and CIOMS 2016 standards, it has been ethically approved. All patients were informed of the nature and purpose of the study in writing and orally. They also provided informed consent to participate.

RESULTS

Respondent's characteristics

Among the 84 respondents, the average age was

48.85 ± 12.05 years, ranging from 19 to 71 years. Of these, 64.3% were female. Regarding education, 75.0% of the respondents had completed schooling, and 51.2% were employed. The majority of respondents were married (86.9%). In terms of cancer duration, 92.9% had been affected for less than five years. The average number of chemotherapy cycles was one, with 50.0% of respondents in their first cycle. Most respondents had no comorbidities (83.3%). Additionally, 56.0% had a history of surgery, while 67.9% had not undergone radiotherapy (**Table I**).

Table I: Demographic characteristics of respondents (n= 84)

Characteristics	f	%
Age (years) mean (SD)	48.85 (12.05)	
Gender		
Male	30	35.7
Female	54	64.3
Educational level		
School	65	75.0
University	21	25.0
Occupation		
Unemployed	41	48.8
Employed	43	51.2
Marital status		
Nonmarital	7	8.3
Married	73	86.9
Widowed	4	4.8
Duration of having cancer		
< 5 years	78	92.9
≥ 5 years	6	7.1
Stage of chemotherapy		
Stage 1	42	50.0
Stage 2	24	28.6
Stage 3	18	21.4
Comorbidities		
No	70	83.3
Yes (Hypertension, DM)	14	17.7
Post-surgery		
No	37	44.0
Yes	47	56.0
Post-radiotherapy		
No	57	67.9
Yes	27	32.1

Pain and fatigue scores

Nearly 60% of the patients reported experiencing mild pain, 28.6% reported moderate pain, and less than 15% reported severe pain. Regarding the worst pain experienced in the past 24 hours, nearly a quarter of the patients reported mild pain, around 27% reported moderate pain, and half reported severe pain. For overall fatigue, almost a quarter of the patients reported mild fatigue, while the majority (77.4%) reported severe fatigue (**Table II**).

Correlation between pain, fatigue, and quality of life among cancer patients

A correlation was observed between pain and fatigue ($r = 0.393$, $p < 0.01$). There was a significant correlation between pain and quality of life ($r = -4.59$, $p < 0.01$) as well as between fatigue and quality of life ($r = -3.25$, $p < 0.03$). Among the Brief Pain Inventory (BPI) items, "pain in activity during 24 hours" had the highest average score (6.50). In the Multidimensional Fatigue Inventory (MFI), the item "general fatigue" had the highest average score (14.82), while in the EORTC QLQ-C30, the item "emotional function" recorded the highest average score (62.21) (**Table III**).

Table II: Frequency and Percentage of Level of pain and fatigue

Item	n	(%)
Pain right now		
Low	49	58.3
Moderate	24	28.6
High	11	13.1
Pain during the past 24 h		
Low	19	22.6
Moderate	23	27.4
High	42	50.0
Fatigue		
Low	19	22.6
High	65	77.4

Table III: Scores on BPI, MFI and QOL among cancer patients (n = 84)

Item	Range	*Mean ± SD*
BPI-6 pain right now	0-10	4.11 ± 2.17
During the past 24 h	0-10	6.33 ±2.09
BPI-9A activity	0-10	6.50 ± 1.92
BPI-9B mood	0-10	4.74 ± 2.14
BPI-9C walking ability	0-10	5.74 ± 2.44
BPI-9D normal work	0-10	6.11 ± 2.02
BPI-9E relation with other people	0-10	3.27 ± 1.83
BPI-9F sleep	0-10	4.60 ± 2.43
BPI-9G enjoyment of life	0-10	5.61 ± 2.11
MFI		
General fatigue	4-20	14.82 ± 1.86
Physical fatigue	4-20	14.24 ± 1.98
Reduced activities	4-20	12.07 ± 2.32
Reduced motivation	4-20	14.70 ± 1.80
Mental fatigue	4-20	12.82 ± 2.25
Average score of MFI	4-20	68.65 ± 6.78
EORTCQLQ-C30		
Physical function	0-100	42.79 ± 23.84
Role function	0-100	38.39 ± 21.56
Emotional function	0-100	62.21 ± 27.45
Cognitive function	0-100	61.70 ± 24.82
Social function	0-100	47.69 ± 25.02
Nausea and vomiting	0-100	46.10 ± 26.30
Fatigue	0-100	59.65 ± 15.90
Pain	0-100	58.88 ± 20.75
The average score of EORTCQLQ-C30	0-100	47.83 ± 9.006

Note: BPI = *the Brief Pain Inventory*. MFI = *the Multidimensional Fatigue Inventory*. EORTCQLQ-C30 = *the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire*

DISCUSSION

The demographic analysis revealed that most respondents were women (64%), averaging 48.85 years. Previous research has highlighted that women diagnosed with cancer often have psychosocial concerns before treatment, which can exacerbate symptoms of pain and fatigue[17]. Additionally, aging is a significant factor contributing to the rising cancer incidence, partly due to the prolonged hormonal influence, particularly estrogen, which can promote cancer development[7]. Most respondents (92.9%) had been diagnosed with cancer for less than five years, during which fatigue tends to peak, particularly in the initial years of intensive treatment, before gradually subsiding[18].

This study evaluated the correlation between pain, fatigue, and quality of life. In 24 hours, about 77.4% of patients reported moderate to severe pain along with significant fatigue. These results are consistent with previous research indicating that around 60% of patients demonstrated moderate to severe fatigue[4]. Another study also showed that more than half of cancer patients experience fatigue, higher than in the general population and other diseases[8]. Fatigue is the most common and painful symptom experienced by cancer patients. Furthermore, a previous study reported that 86.3% of cancer patients had moderate to severe fatigue, often in conjunction with pain and insomnia, which are significantly correlated[19].

Regarding the impact on several aspects of life, the BPI-9A activity recorded the highest score. The BPI-9D everyday work also showed the second-highest score. These findings indicate that pain significantly impacts general activities and regular work that are usually performed. Additionally, MFI-reduced activities and MFI-reduced motivation also showed high scores. This finding suggests that pain and fatigue impact patient activity. This finding aligns with the research by Liu, Weng, Wu, and Huang (2023), who found that pain and fatigue significantly impact patient activity. Body pain and fatigue affect the patient's activities to a certain extent. Complications from the disease and its treatment also contribute to substantial lifestyle changes[4].

The study also revealed a correlation between pain and fatigue ($p < 0.01$) among patients diagnosed for less than five years (92.9%). Patients typically experience chronic fatigue after completing cancer treatment[20]. Fatigue impacts activity levels (14.82±1.86) and emotional function (62.21±27.45), reducing overall quality of life. Quality of life has become an essential issue in treatment and recovery. Cancer patients often express concerns about disrupted work, altered family roles, psychosocial challenges, body image issues, diminished self-esteem, and relationship strain, all of which further lower their quality of life[21].

CONCLUSION

The respondents had an average age of 48.85±12.05 years, with the majority being women (64.3%) and without comorbidities (83.3%). Most patients were in the first cycle of chemotherapy (50.0%) and experienced severe pain and fatigue in the last 24 hours. This study identified correlations between pain and fatigue ($p < 0.01$), pain and quality of life ($p < 0.03$), and fatigue and quality of life ($p < 0.01$). Pain and fatigue significantly impair patients' functional activities and quality of life. Even years after diagnosis and treatment, these symptoms persist. Nurses should prioritize patients with moderate to severe pain, investigate symptom interactions, and implement comprehensive symptom management strategies to enhance patients' quality of life.

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AUTHOR CONTRIBUTION

Ahyana: wrote the initial manuscript, collected data, analyzed data, and wrote a discussion.
Husna C: carried out data analysis and wrote the discussion.
Dewiyuliana: writing background and collecting data

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